

Electromagnetism Practice Test

1. 0.17 T

2. $F = BIL = 1.5 \times 25 \times 1.2 = 45$ N East to West



3.

a) $F_g = F_B$ $mg = BIL$ $I = mg/BL =$
 $0.00014 \times 9.8 / (0.02 \times 0.035) = 1.96 = 2.0 \text{ A}$
(use 3.5 cm because it is perpendicular to the field)

b) double, so 0.28 g

4. $2.0 \times 10^{-4} \text{ Nm}$ (see last classes notes)

5. a- $E_e = E_k$ $Ve = 1/2 mv^2$

V is accelerating voltage, e is the charge

b) no because the force is always perpendicular to the displacement $W = Fd \cos \theta$

c) constant

d) circular

e) $mv^2/r = qvB$

$mv^2/R = evB$

$$e/m = v/RB$$

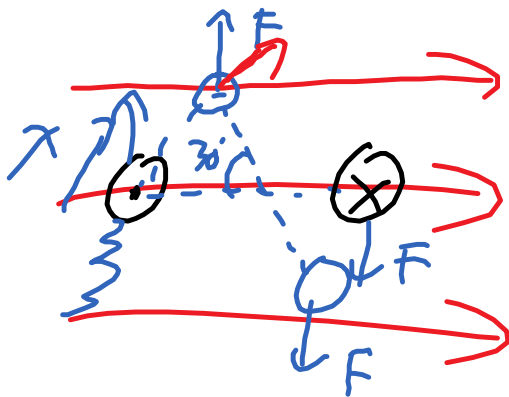
6. a- $Vq = \frac{1}{2}mv^2$ $v = \sqrt{2 \times 2600 \times 1.6 / 1.67} = 70.58353864849589$

$$7.1 \times 10^5 \text{ m/s}$$

b) $mv^2/r = qvB$ $r = mv/qB = 1.67 \times 7.058 / (1.602 \times 0.8) = 9.197$
 $9.2 \times 10^{-3} \text{ m}$

7. $F_e = F_B$ $Eq = qvB$ $E = vB = 8 \times 4 = 32$
 $3.2 \times 10^4 \text{ N/C}$

8.



If θ is proportional to the F ,

then $2/3$ of $30^\circ = 20^\circ$

but the component of F causing the torque is proportional to $\sin\theta$

$$\text{so } F_1/F_2 = \sin\theta_1/\sin\theta_2$$

$$I_1/I_2 = \sin\theta_1/\sin\theta_2$$

$$1/(2/3) = \sin(30^\circ)/\sin\theta_2$$

$$\theta_2 = \text{Arcsin}((2/3) \times \sin(30)) = 19.5^\circ$$

Quiz Next Class - questions will be based on

the theory of the Lab (CRT) and practice test